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Science News-Letter

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How Healthy Are Your Children?

IN THE LAST TWENTY-FIVE YEARS THE NUMBER OF CHILDREN between the ages of one and four that die each year has been reduced from 21 to 6 in every thousand. Statisticians say the death rate should soon be reduced to 1 per 1000

By MARJORIE MACDILL,

The nation is beginning to awaken to its responsibility for the health of its children.

With vacation over, the annual autumnal process of cramping some 19,838,384 young wild Indians within the limits of blackboards and brick wall will soon be under way.

Are Johnny and Mary all ship-shape and in good physical trim to take their part in the ordeal?

Preparation for school these days is coming to mean something more than blowing the dust off the books that were parked on the closet shelf last June and a trip downtown with Mother to try on the bargains of Get Ready for School Week. Mary's adenoids make almost as much commotion in the grammar grades as her deficiency in arithmetic. If Johnny continues to hold his book up in front of his nose and is still minus glasses, a better quality parental alibi should be forthcoming than the one cooked up by Johnny to account for the marks on his monthly report card.

It is being strongly urged by public health officials that children should come back to school with their health defects corrected and their physical plumbing all in order to meet the demands of the coming year. It is hard to curtail a fellow's activities during vacation but the future will probably see organized health drives for this end instigated in June. Then all the "healthy" jobs of glasses fitting, tonsil removing, diphtheria immunizing, not to mention the remedying of more serious handicaps, can be accomplished without wasting school time and the patients will have the chance to recuperate out-of-doors.

The health inventory against which Johnny and Mary can be

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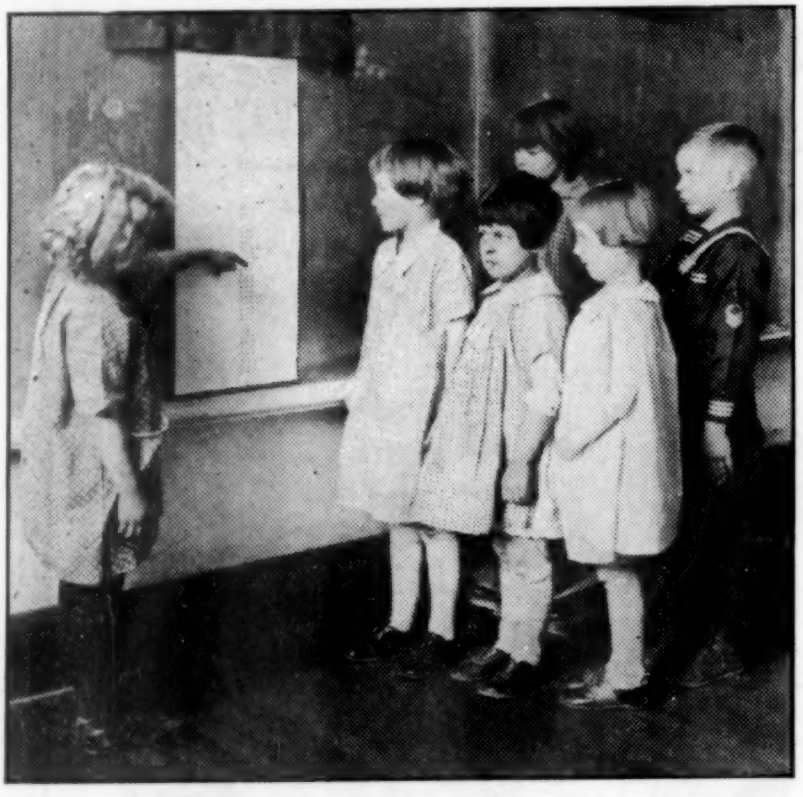

DIPHTHERIA immunization puts tots on this honor roll. This scene was taken at a Milbank Memorial Fund health demonstration in Syracuse, N. Y.

Are Your Children Healthy?

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checked should lead off with smallpox vaccination and diphtheria immunization. The first is required in most public schools anyway and its benefits need no elucidation. Diphtheria deaths among children under five years in this country have dropped from 12,300 in 1910 to 5,000 in 1925, due largely to the curative antitoxin and the preventive treatments which assure a child of protection from this disease for many years, if not for life.

Everyone realizes that care of children's teeth is only another form of insurance. Some 80 per cent. of school children, according to figures from the U. S. Public Health Service, have decayed teeth. During the sixth year the first permanent molar arrives and upon the health of this tooth the shape of the jaw and regularity of the dental arches largely depend. So this is a critical period when a trip to the dentist should be made.

Eyes and ears should be tested if there is any indication that either sight or hearing are not up to normal and suspicious tonsils should go where all bad tonsils belong. It has been found that children whose tonsils have been removed are less likely to suffer not only from tonsilitis but from heart disease, rheumatism and scarlet fever as well.

An all-round health examination will also uncover any indications of

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American Chemical Society Talks Automobile

At the autumn meeting of the American Chemical Society which has just closed its sessions at Detroit much attention was given, appropriately, to the subject of the relation of chemical science to the automotive industries. The following report devotes itself to the highlights of these discussions. In next week's issue other aspects of this meeting will be presented by Dr. Edwin E. Slosson.

Detroit this week was host to an army of 2,000 chemists, members of the American Chemical Society, whose sessions closed Saturday, September 10. Every phase of chemistry, from the abstract problems of the teacher and research worker to the practical applications of factory and farm, was up for discussion.

In consideration of Detroit's position in the field of automobile manufacturing, an important position on the program was given to chemical problems connected with that industry. The principal session on the opening day was devoted to a symposium of the chemical angles of the steels, fabrics, finishes, glass, fuels and lubricants that are concerned in the manufacture and use of motor vehicles.

Dr. Rosengarten's Address

The outstanding event of Wednesday's program was an evening gathering addressed by Dr. George D. Rosengarten, president of the Society.

Previous ages of man's history have been known as the Age of Stone, the Age of Bronze, the Age of Iron, and so on. The present time is preeminently the Age of Chemistry. This was the thesis of Dr. Rosengarten's paper.

Even in the past, chemistry played a leading part in man's progress, Dr. Rosengarten declared, though man has not always been conscious of its importance. The change from the Age of Bronze to the Age of Iron, 3,000 years ago, was largely a chemical change. The task of the present and the immediate future is the full mastering of the basic principles of chemical science.

"An important problem and one requiring our immediate and undivided attention is so-called 'pure chemistry,'" he said. "I should rather like to call it 'science of chemistry' in contradistinction to the practical application of chemistry which would be more correctly designated as the 'art of chemistry.'

"Pure science is the protoplasm of applied science. It is the brick and mortar of our sky-scraping buildings of industry and commerce. Our civilization of which we are so proud, the comforts of life we are enjoying, are wholly built on discoveries emanating from the search for scientific truths, from the pursuit of science for the sake of the science itself. As Secretary Hoover has very tersely put it: 'It is in the soil of Pure Science that are found the origins of all our modern industries and commerce.'

"The relationship between the science of chemistry and its varied and multitudinous applications is quite apparent to the chemist, but for our lay guests let me cite one or two of the thousands of examples. About one hundred and twenty years ago, Sir Humphrey Davy in his pursuit of scientific knowledge for the sake of knowledge discovered a method of separating the 'refractory' metals potassium and sodium from their combinations. Based on this fundamental discovery, Hall, an American, and Heroult, a Frenchman, prepared the metal aluminum. But for the availability of this metal, aviation would still have been a Midsummer Night's Dream.

"This metal has also added immensely to family happiness. Aluminum kitchen utensils are easy to wash and keep clean, making less work in the household, and consequently stabilizing domestic felicity.

"We are living on the scientific researches of a hundred or more years ago. We are plucking the fruit of trees of knowledge planted by our forebears. We have worked hard and fast to get all we can out of the funds of discoveries of past centuries, but we cannot much longer go on harvesting without planting. We owe to posterity what past generations have provided for us. We must not fail in our duty, we must not go back on our indebtedness."

Inventions Needed For Automobiles

In the symposium on "Chemistry's Contribution to Automotive Transportation," H. C. Mougey of the General Motors Corporation specified some problems in the field of automobile finishes that still remain to be solved by the chemist. Among these needed inventions are:

"A substitute for black baking enamel which will retain the advantages of low cost and ease of application but which will make the steel more resistant to corrosion under conditions of high humidity, and which will produce a film that holds its luster longer on exposure.

"Primers and surfacers for lacquer finishes, which will decrease the time of drying without increasing the cost of application.

"Some method of obtaining the smooth surface of high luster without the cost of the present system depending on hand rubbing and polishing."

Prof. D. B. Keyes of the University of Illinois said that the ideal anti-freeze compound for automobile radiators has not yet been reached. The three substances now most widely and successfully employed are alcohol, glycerine and ethylene glycol.

Evolution of Coated Fabrics

Cloth coated with various wear and weather resistant materials masqueraded as leather in the early days of the automobile. Now, however, the various coated fabrics have reached a stage of excellence where they can make their own way on their own merit, and "imitation leather" as a term of semi-reproach is no more, according to Dr. Hamilton Bradshaw of the du Pont laboratories at Wilmington.

Coated fabrics are of three principal types. They are coated with preparations of linseed oil, with rubber, and with pyroxylin, which is one of the new "plastics" made by dissolving cotton or wood-pulp cellulose in an acid. The linseed oil fabrics belong to the oilcloth class, which are little used in motor cars. The rubber preparations are used mainly in top fabrics, for both open and closed cars. In the latter class they have wholly replaced the old solid, rattly tops of wood or metal.

Pyroxylin fabrics are almost universally used as upholstery in open cars now, the speaker declared. Over ninety per cent of such cars turned out last year were upholstered in this type of leather replacement. The strange part of it is, that now the coated fabric does not need to imitate leather it has reached the point where it can fool even an expert. Dr. Bradshaw told of examining a car that was finished partly in real leather and partly in grained coated fabric. Only when the leather and fabric were loosened and their

(Just turn the page)

American Chemical Society

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backs examined was he able to tell them apart.

Value of Reclaimed Rubber

"Old rubber!" Once merely a part of the ragman's chant, these words have now become a powerful economic charm, operating in high-price years to soften the impact on the tire-buyer's pocketbook and in low-price years to save the tire-making industry from disaster.

The importance which reclaimed rubber has assumed in the industry, thanks to new chemical processes which have greatly improved its quality, was discussed by William C. Geer, of New Rochelle, N. Y. In one year, Mr. Geer stated, the use of reclaimed rubber saved the consumer $55,297,000.

Another recent improvement which has been made in rubber is the addition of chemicals to slow down the rate of oxidation, which does to rubber what rust does to steel. Rubber articles have had their lives thus lengthened by from two to ten years, the speaker declared.

Mr. Geer doubts both the need and the commercial possibility of artificial rubber. American-grown rubber is in sight, and this, with further improvements in reclaimed rubber, will take care of our needs for a long time to come, he said.

Use of Grinding Machinery

The single general-purpose emery wheel of the old-fashioned machine shop would be amazed—supposing it had a consciousness—if it could come back and see the family of abrasive machinery that has taken its place in the modern monster automobile factories. Not only have the new grinders new shapes and uses, but they are made of new materials, born of the electric furnace. Dr. Lowell H. Milligan of Worcester, Mass., told of the importance of abrasives in literally grinding out automobiles.

"It has been said that a Ford manufactured by former methods would cost as much as a Rolls Royce does now, were it not for grinding," Dr. Milligan stated. "In 1904 there was not one grinding machine in the automobile industry. Today there are 68,000. Countless parts of an automobile are finished by grinding. The chemists and metallurgists have been continually making tougher and harder steels which cannot be satisfactorily machined, but must be shaped by grinding.

"Abrasives are of service not alone as grinding wheels. Loose abrasives are used, suspended in grease or water, for grinding valves, for lapping piston pins and rings, crankshaft pins and bearings, and for surfacing plate glass.

"Glued on the surface of polishing wheels, abrasives serve to smooth and polish radiators, fenders, bumpers, and many other metal parts. Fine abrasives cemented on paper or cloth are used for various finishing operations, conspicuous among which is the smoothing and surfacing of lacquers on automobile bodies."

Toward Artificial Rubber

The production of artificial rubber is apparently brought a step nearer by researches made at the University of Notre Dame by the Rev. J. A. Nieuwland. Working in association with Daly and Sister M. Florentine, he has found that a ninety per cent. yield of ethylene chloride can be obtained by passing ehtylene and chlorine gases into antimony pentachloride. The product can be readily converted into vinyl chloride by alcoholic potash.

This chemical reaction will seem unintelligible and unimportant to the general reader but yet it may have a bearing on one of the most exciting commercial controversies of the day. For Plotnikoff proved in 1922 that vinyl chloride could be converted into rubber by the action of ultra-violet rays from an electric light. The electricity may come from water power which may also make calcium carbide of coal and lime. Adding water to the carbide generates acetylene gas which is easily made into ethylene. So the chain is complete from the waterfall to the rubber tire. But it is very questionable if rubber can be made in a factory as cheaply as it can be grown in a tree.

Roads A Chemical Problem

In the early days, when an auto got stuck in the mud of a country road, the cry was "get a horse." Now it is "get a chemist."

The greatest challenge by the motorized world to the modern chemist that has not yet been answered is the challenge of the clay road, declared Charles M. Upham, chairman of the highway research board of the National Research Council. Clay, like everything else, will respond to chemical treatment, the speaker said. The chemist must somehow get it to do three things. He must treat it so that it will drain instead of absorbing water and turning into glue. He must cure it of its present disturbing habit of shrinking and swelling according to the amount of water it has taken up. He must increase its ability to bear loads when moist, and improve its workability by road machinery. The chemist who can do this will simply revolutionize road construction.

A further contribution which chemists may make to highway improvement is in the manners of asphalt, preventing it from becoming exceedingly hard in winter and soft as putty in summer.

Test Garage Air for CO

How great is the danger of carbon monoxide poisoning to which garage employes are exposed? We read frequent accounts in the daily news about automobile owners who have committed involuntary suicide in their small private garages by running the engines when the doors are shut. Yet mechanicians work all day behind closed doors in large garages. How much of an industrial hazard are they exposed to?

Dr. S. H. Katz of the U. S. Bureau of Mines and Dr. H. W. Frevert of the U. S. Department of Agriculture have been endeavoring to find an answer to these questions. The two investigators collected samples of the air from a large government garage in Washington and from a large commercial garage in Pittsburgh, and subjected them to chemical analysis. They found that the working conditions in the government garage, so far as the poisonous gas was concerned, were better than those in the commercial establishment. During the regular working day the concentration in the government garage never exceeded one part of carbon monoxide in ten thousand parts of air, while in the Pittsburgh shop the maximum was two-thirds again as much, or 1.64 parts in 10,000.

In neither establishment did the concentration reach the danger point, though during one hour the carbon monoxide in the Pittsburgh garage attained a "bad eminence" of 4.33 parts per 10,000 of air. This, it was stated, is enough to cause headache in some men.

The report adds, however, that the investigations were conducted under only average working conditions. In very cold winter weather, when the garage doors are likely to be kept more tightly closed, conditions may become more serious.

British Science Association Talks Evolution

The first dispatches from the meeting of the British Association for the Advancement of Science at Leeds, England, are presented here. Further news of this important meeting will be given in the next issue of the Science News-Letter.

Darwin Was Right

Yes! was the emphatic answer given by Prof. Sir Arthur Keith, president of the British Association for the Advancement of Science, to the question contained in his presidential address opening the annual meeting:

"Was Darwin right when he said man, under the action of biological forces which can be observed and measured, has been raised from a place amongst anthropoid apes to that which he now occupies?"

And this eminent London anthropologist and anatomist declared that, in rendering this verdict, he spoke not in the role of special pleader but as foreman of a jury that has been impanelled from men who have devoted a lifetime to weighing the evidence upon human evolution.

"All the evidence now at our disposal," Prof. Keith said, "supports the conclusion that man has arisen, as Lamarck and Darwin suspected, from an anthropoid ape not higher in the zoological scale than a chimpanzee, and that the date at which human and anthropoid lines of descent began to diverge lies near the beginning of the Miocene period. On our modest scale of reckoning, that gives man the respectable antiquity of about one million years."

Since Darwin made his revolutionary studies, Prof. Keith explained, an enormous new body of evidence has poured in. It is now possible to fill in many pages which Darwin had perforce to leave blank, it has been necessary to alter details of the narrative, but "the fundamentals of Darwin's outline of man's history remain unshaken!"

Evolution is infinitely more complex than was suspected in Darwin's time. Prof. Keith expressed this by saying: "To unravel man's pedigree, we have to thread our way, not along the link of a chain but through the meshes of a complicated network."

As convincing proofs of man's anthropoid origin, Prof. Keith cited the discovery that the blood of man and the great anthropoid apes give almost the same chemical reaction. Huxley's observation that there is no structure in the human brain that was not already present in that of the anthropoid has been confirmed by thousands of anatomists. The expansion of various parts of the anthropoid brain gave man his powers of feeling, understanding, acting, speaking and learning. Darwin's psychological observations, which convinced him that the differences between the mentality of man and ape are of degree and not of kind, have been verified and extended by modern psychologists.

Despite the advances made in tracing man's past, Prof. Keith declared, there is much that is not yet understood. Why, he asked, did the brain of man make such great progress while that of his cousin the gorilla has fallen so far behind? Why does inherited ability fall to one family and not to another? In the matter of brains, why has one race of mankind fared so much better than another? Such unexplained questions as these will be answered, Prof. Keith believes, when the scientists utilize such sources of knowledge as the new researches upon the endocrine glands.

Ice Age Man Like Moderns

Homo sapiens, the same sort of human being as now populates Europe, existed upon the European continent in Pleistocene times, the geologic period last preceding the present, when the great glaciers came. This was the assertion of Sir W. Boyd Dawkins, veteran British anthropologist who was a coworker of Thomas Henry Huxley. In those ancient times man appeared in what is now Europe as an immigrant from Asia and even then he had the same physique as the basic population of present-day Europe. "When we look back upon the long period taken by man to ascend from the position of hunter to that which he now holds," he said, "we may look with confidence to future man ascending the scale still further."

Englishmen Growing Taller

Looking into this future, Prof. F. G. Parsons of the University of London, delivering the anthropological presidential address, predicted the physical characteristics of the future Englishman. His height will increase from the present average of five feet five inches to five feet nine. Even now this stature is attained by the well-to-do classes. The women will have an average height of five feet six or seven inches. The head of the future Englishman will increase in proportional height and decrease in proportional length, Prof. Parsons said. This physical highbrowednes Prof. Parsons believes to be a real evolutionary process brought about by the changed conditions of life in the last century.

Little Future for Antarctica

Little hope for the settlement of the great unknown Antarctic continent is held out by Dr. R. N. Rudmose Brown in his presidential address before the section of geography.

"The Antarctic has no human problems comparable with those of the Arctic," he said. "It is true that whaling has recently invaded the Antarctic, with the vessels in the Ross Sea, not to mention the sub-Antarctic whaling in South Georgian and Falkland waters. But this can be little more than a passing phase. Already some species of whales show signs of depletion of numbers, and unless whaling is so rigorously shackled by regulations as to make it of little profit compared with the risk it entails, the industry must kill itself in a few years' time. For the rest there is nothing of value in commerce in the Antarctic: certainly nothing that it can possibly pay to exploit. The stories of future Antarctic coal mines can be dismissed as a dream without any solid foundation. It is fortunate. And those of us who care for the wild waste spaces of the world are glad to think of the Antarctic as free from invasion by our modern civilization with its insistence on hurry and noise. We are glad to remember the lonely places of the world and their matchless beauty, content to know that to others they will bring the same fascination they did to us in years gone by."

With regard to the Arctic, Dr. Brown sees the possibility of scattered colonists of pastoral interests and fur farms here and there supplying high-priced Arctic furs in limited numbers.

"The settlement of the Arctic must wait until the pressure of population on the world's resources is even greater than it is today," he said. "The remoter parts, those without rich tundra and the ice-covered seas and lands, must remain deserts, visited only by roving hunters and occasional explorers. In short, I see a shrinking of the Arctic wildernesses,

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British Association

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but never their disappearance. I cannot take as glowing a view of Arctic settlement as Stefansson can, or visualize the same attraction to population which he forecasts, and I am skeptical of the value of Arctic lands as stations on the air routes of the future. But even if he has overstated his case, his long-sighted views have done something to dispel current misconceptions and reduce the area of polar wastes."

Universe's Size Measured

One hundred million light-years. Such is the approximate maximum radius of the universe as estimated by Prof. E. T. Whittaker of Edinburgh University in his presidential address before the section on mathematical and physical sciences.

The light that is used as a yard-stick travels at the rate of 186,000 miles per second. Multiply the number of seconds in a year by this factor and then by a hundred million and the product will be the mileage of the universe's radius.

Light appears to an ordinary mortal to be traveling always in a straight line, but Einstein's theory of relativity, upon which Prof. Whittaker's calculations are based, holds that the straightest light ray is curved, due to the presence of matter. Most of the universe is a vast void of space even in a thickly populated region such as in our galaxy, so the curvature due to the total mass of matter is very slight and it takes a long time for light to make the circuit. Physicists explain that the universe is finite but boundless, very much as the surface of the earth has no end but does have definite size. A ray of light starting out from a star because of this curvature of space is capable of traveling around the universe and reaching its point of origin from the opposite direction. By a strong magnetic field with laboratory apparatus it is possible to produce a curvature of space corresponding to a radius of only one hundred light-years but this action is confined to a very limited area.

Would Tap Earth Heat

Thirty-one million times as much heat as there is in the whole coal supply of the world, heat enough to raise from freezing to boiling point sixteen thousand nine hundred million million million tons of water, lurks far under the surface of the earth awaiting a taker. This is not the dream of an H. G. Wells but the bold project of an English engineer, John L. Hodgson.

It is probable that the internal heat of the earth is increasing, Mr. Hodgson said, thus balancing the losses due to radiation from its crust. This increase in geothermal heat is due to friction of the deep-lying rock layers as they slide over and crush each other.

A possible way of capturing the earth's internal heat would be to sink great shafts to a depth of five miles, connecting them by horizontal passages thirty miles long and ten feet in diameter. Such a hole would cost not more than thirty million dollars, or only ten times the cost of a power station capable of an equal yield of power but requiring endless feeding with fuel. The average yield during the first thousand years of its operation from such a shaft would be fifteen thousand eight hundred British thermal units per second, with never a shovelful of coal or a quart of oil burned.

The cost of sinking these giant shafts might be reduced if valuable ores were encountered on the way down. Technical difficulties of keeping workers alive could be met, Mr. Hodgson thinks. Heat-proof suits and ventilation cooled with liquid air from great cylinders were two of the suggestions he made. He likened modern man now sitting on these vast stores of unused internal earth heat to the earliest generation of coal miners who timidly scraped surface outcroppings. They knew there were great supplies of coal at deeper levels, but could not get at them with the crude equipment they had. Now modern machinery is getting that coal, and the gigantic engineering enterprize of our descendants may similarly tap the energy of the earth itself.

New Methods in Physiology

"The proper study of mankind is man"; and this holds for his inner physiology as well as for his mental and social activities. So claimed Dr. C. G. Douglas of St. John's College, Oxford, speaking before the physiology section.

Experiments on animals are all very well for rough comparative results, Mr. Douglas said, but when we want to find out how the human machinery really works we have to make our observations on a man. This does not involve punching holes in him or sawing him up; it is the physiology of whole, normal, active human beings we are principally interested in, and this can be studied without pain or inconvenience to persons who volunteer for the work.

Good beginnings have been made in the study of human physiology, Dr. Douglas stated, especially in the field of oxygen requirement and other aspects of respiration. Food and its assimilation furnish an equally promising field, but one that has been less explored. Still other possibilities may be found in the chemistry of the blood and in the action of the nervous system.

Science News-Letter, September 10, 1927

News-Letter Features

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STARTING RIGHT. This young husky is getting one of the physical examinations recommended by the U. S. Children's Bureau

Are Your Children Healthy?

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incipient tuberculosis or heart defects that can be brought into subjection more readily than if allowed to develop unsuspected. In some regions it is wise for children to be immunized to typhoid fever in addition to diphtheria.

Prevention Better Than Cure

These are a few of the high spots of health to which every child should be carried. With the exception of yellow fever, which has been fairly effectively stamped out in civilized countries, very few of the great discoveries of preventive medicine have been applied to anything like their fullest possibilities. There are effective ways of preventing smallpox, typhoid fever and diphtheria and yet flare-ups of these highly fatal diseases continue to exact a needless toll of human life.

It is beginning to trickle slowly through the consciousness of the American people, through the constant warnings of doctors, the demonstrations of health experts, and figures of statisticians, that waste of life is waste of money and that health like education pays.

Every Baby Boy Worth $9000

Dr. Louis I. Dublin, statistician of the Metropolitan Life Insurance Company, estimates that the lives of 110,000 babies under a year old and 52,500 children from one to fifteen years of age can be saved each year if communities would only wake up to their opportunities of controling the conditions which destroy the lives of children and apply modern preventive medicine. Since studies by Dr. Dublin show that the potential value of a new-born baby is $9,000 and that a boy at the age of 15 is worth in excess of $25,000 to society, the preventable deaths of children represent an economic loss that runs into millions even when the sufferings of little children and the griefs of their parents are not considered.

The Doctor Bill for Children

As a people we are not a bit parsimonious in matters of education. From the very beginning we have believed that it is worth what it costs. The more advanced communities spend well over $100 on the training of each child every year and think the money well used. This liberal policy

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Are Your Children Healthy?

(*Continued from page 167*)

is only beginning, however, to be carried over into care for the body as well as the mind. Not much more than 60 cents per capita is being expended in the largest cities on child health work, according to Dr. Dublin.

There would appear to be little use in spending $100 on a child's educaton if for the lack of a couple of additional dollars he is handicapped in reaping the fullest benefit of that training.

The problem of keeping children well, in Dr. Dublin's opinion, is not so much one for the individual parent as it is a community problem for common solution. Today the individual parent does little more than attempt to repair damage done by disease. yet the cost of sickness among children is astounding. The average child is sick from four to eight days a year, and his doctor and nursing bills are not less than $5 a year, imposing a tax of some two hundred millions of dollars upon the nation annually. If only $1.50 per capita annually were spent on keeping the children well, totaling less than the loss due to child sickness alone, the waste of neglected children would be prevented. From $2 to $2.50 per child would be a more adequate sum. With this an ideal health department could carry on activities of child welfare that would lead to the saving of the lives of 162,500 children in this country annually.

Milk in the Dark Past

It is a far cry from ideal health departments to the famous case of Mary Ellen that attracted wide attention some fifty years ago. This unfortunate Manhattan waif was rescued from the clutches of cruel and inhuman step-parents by the Society for the Prevention of Cruelty to Animals in 1866 because there was then no organization in existence that looked after the welfare of children.

In those days it was taken for granted that genus homo was particularly susceptible and friable in his early years. Babies and children died off more readily than grown-ups and that was all there was to it. They were cared for when they were sick and it occurred to no one to take special steps beyond ordinary care to keep them well. It was only in 1910 that these enlightened United States even published mortality statistics for babies under one year old.

Only twenty-five years ago the bacterial count of New York City milk was higher than ordinary sewage and most cities were no better off. In 1840 five-sixths of New York City's milk supply came from cows stabled inside the city. A classic description of a barn of that period states it housed 2,000 cows. It was owned by a neighboring distillery and the cows were fed entirely on distillery waste. The animals never left the place except to go to the slaughter house, when dying or to the city dump if they died before they could be sold as meat. The milking was done by tramps and hoboes in return for the privilege of sleeping in the barns. At this tme New York had a death rate of 25 per thousand of which one-half were children under five years of age.

Babies Saved Since 1900

In 1900, 169 of every thousand babies born died before they were a year old. This rate has now been pulled down to 75 per thousand, and better improvement has been shown in the group of children between the ages of one and four. Whereas twenty-five years ago there were 21 deaths in every thousand children of these ages, now only six perish. This in turn can be reduced to only one per thousand, Dr. Dublin believes, if additional medical discoveries are made and modern facilities for nutrition and care are applied.

Great progress in keeping children healthy has been made in the community health demonstration centers where experts furnished with funds from private endowment are working hand in hand with the local public health officials. In one such community, that of Athens, Ga., a city of 16,000 inhabitants, no child died of diphtheria, whooping cough, measles or scarlet fever in the year of 1926.

Syracuse, N. Y., the scene of an interesting health demonstration undertaken by the Milbank Memorial Fund of New York, has not had any deaths from scarlet fever since 1924 and has had the lowest diphtheria death rate it has known in years.

The directors of this fund have undertaken the experiment of determining how long living can be prolonged in three typical sections of American life. One is in the rural county of Cattaraugus in southwestern New York, the second is in the medium-sized industrial city of Syracuse, while the third is in the heart of New York City. The fund affords expert consultants and provides money for services which would not otherwise be available. At the end of four years the health organization in the first two communities is partially self-supporting, showing that many citizens are willing to pay the bills for better conditions when their value is definitely brought home.

The Normal Child

What constitutes a normal healthy child is a question to which teachers, nurses, physicians and health workers generally are devoting a great deal of attention. It is felt there must be some sort of standard by which the well-being of all childhood can be gauged; for in the past even doctors have known very little about the average husky youngster because the normal was studied only to bring out the abnormal.

Secretary of Commerce Herbert Hoover, president of the American Child Health Association, has defined the normal child in the following terms:

"The normal child has firm, strong muscles.

"He has well formed, well enamelled teeth.

"He breathes deeply and easily.

"He participates in ordinary exercises without fatigue. He has pep, he shouts, yells, races and makes a noise; this is sheer animal spirits letting off steam.

"In mental terms he is neither superfluously happy nor deeply discouraged but his moods may vary at times from great happiness to deep discouragement."

It does not need to be pointed out to the average parent that no two of his offspring are ever exactly alike and that what is normal for one age is not for another. Yet on the other hand there are some factors that are common to all children of the same age. Science is all the time bringing to light new facts about child development and gradually health workers and parents alike are learning what to expect as they watch their children grow. Leaders in the medical profession admit that far too little stress has been placed on teaching the welfare of the child in the training of young medics, but the time when the doctor is called in only after the child is sick is passing. Paying the doctor to keep children well is on the verge of coming out of the idealist's Utopia into the realm of hard common sense.

Science News-Letter, September 10, 1927

The Isle of Pines gets its name from its remarkable tropical forests of pine trees.

Some kinds of weed seeds may live as long as 25 years under favorable conditions.

ARCHAEOLOGY

True Story of Archimedes

Fresh light on the manner in which Archimedes, the Greek mathematician of the third century B. C., met his death has been brought to light by an early Roman mosaic now in the possession of a noble family in Germany, according to information received by Dr. Ralph V. D. Magoffin, president of the Archæological Institute of America.

The story of the death of Archimedes is one of the best known tales of classical literature and is one of the stock instances of the eternal combat between ignorant brutality and the search for truth.

"Marcellus, the Roman general," explained Dr. Magoffin, "captured Syracuse in 212 B. C. Some of his soldiers came into a house in the suburbs, where they found a man, whom they ordered to leave. He paid no attention to them. He was engrossed in affairs of his own. He was drawing mathematical designs with a stick in the sand on the floor of his house. One of the soldiers again ordered this queer and inattentive man to get out. As his order was not obeyed, the soldier killed the elderly scientist.

"Cicero and Livy handed down the story about the death of Archimedes with the Latin words *in pulvere describere,* which means drawing figures in the dust. No one of the later commentators seems to have questioned either the mad housekeeping of Archimedes in having so much dust on his flooor that he could trace mathematicaal figures in it with his staff, or the unlikelihood of his having sand on his floor at all. In fact, it is strange that scholars did not jump to the right conclusion before, especially as there was a tip in Apuleius, whose reference in one place to an abacus and sand should have put them on the right track.

"Joseph Napoleon and Joachim Murat, while the French were in power in Naples, conducted considerable excavations at Pompeii and Herculaneum during the years 1806 to 1815. They found a great many good things, the largest part of which were kept in the family, as the sale in 1860 at Rome of the collection of Jerome Bonaparte, after his death, would seem to certify. Among the purchases from that collection was a small mosaic which was acquired by a nobleman from Germany. It is still in the possession of a German countess of the same family in her house

(*Just turn the page*)

BIOLOGY

HERBERT SPENCER JENNINGS

Biologist and Philosopher

Almost every one who ever studied any of the biological sciences at the Johns Hopkins University will tell you, with a brightening reminiscent eye, that the best thing he did there was attend Prof. Jennings' seminar. A seminar is very different from a lecture course, in that the professor listens while everybody else talks (sometimes several at once), but it is very like a lecture course in that the whole atmosphere is still dominated by a single personality.

And the personality of Prof. Jennings makes the atmosphere of his seminar a very favorable one for minds that are moulting their adolescent plumage and preparing for flights of their own. No one can puncture a prejudice more noiselessly and with so little pain. A somewhat shy man himself, no one can more sympathetically induce a shy youth to venture an opinion. Wholly free from cocksureness, he will listen tolerantly to the most dogmatic of declarations; and he knows that gentle ridicule is a far more devastating blast than the most withering winds of scorn.

In the scientific world at large, he figures prominently as a scholar, specializing in the behavior and genetics of animals, particularly of the protozoa. The innumerable cultures of *Paramecium* he nursed during his study of the evolution of these familiar, fantastic creatures have become a matter of proverb.

Prof. Jennings was born in Illinois in 1868. He studied at Michigan, Harvard and Jena, and after "teaching around" for a number of years was called to the Hopkins, where he has been a member of the faculty since 1906.

HYGIENE

Concerning Sandals

By Edwin E. Slosson

George DuMaurier had the unique distinction among novelists of devising a new attraction for his heroine, a well-shaped foot. Ladies with perfect eyes, noses, teeth, lips, hair, hands and even ears had always been common, at least in fiction, but the idea that one could have a perfect foot so took the world by surprise that the book had an unprecedented sale in the nineties and still finds readers. Everybody except those restrained by their principles fell in love with Trilby.

Now this unique attraction of Trilby's was not due altogether to an exceptional gift of nature, but to the fact that she never had worn shoes. Weissmann's theory that acquired characteristics are not inherited receives additional support in that in spite of artificial deformation of the feet of both sexes by hard and tight shoes for generations, the feet of the newborn are still constructed on the old model. Man's intent has been to make himself a hoof such as the horse has developed out of its digital paws. The horse of the Cretaceous period probably had five toes, soft-padded. His descendant of the present day has a compact bunch of bones bound in by a hard, horny integument. We accomplish the same end when we compress our toes into a rigid shoe.

The purpose is, of course, in both cases to increase the speed and reduce the wear and injury of walking on hard ground. Even the horse's hoof is not hard enough to stand our paved streets and we are obliged to reinforce it with an iron rim. Our tender feet have to have some protection against heat and cold and bruises.

There are two ways of protecting from wear and jar. The covering may be hard and enduring or it may be soft and replaceable. A fort can be protected with granite or with dirt. A wheel can be tired with iron or rubber. The progress of evolution, natural and industrial, has been generally toward the yielding rather than the resisting material. The early animals were encased in shell or scale armor; the later and more successful models have soft flesh and tender skin on the outside. The hoof I have already noted as an exception to this rule. Another is our own foot covering, which has remained of leather, although we have long since

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Concerning Sandals

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discarded leather clothing and hats for lighter and more flexible material.

The Japanese and Chinese seem to have gone a step beyond us in this matter. We really need little or no foot covering in our houses, and for outdoor use the shoe best adapted to the double purpose of leaving the foot in its natural condition and protecting it against the heat, cold or dampness of the pavement, the jolt of the step, and the feet of others, would be an elastic felt shoe about half an inch thick with a waterproof coating. The Chinese shoe is the nearest approach to this, as it is light, soft and thick. But it makes the foot look big, and this objection, being an esthetic one, is invulnerable, so there is no use discussing it.

It is curious how long a piece of apparel remains in use after it has lost its reason for existence. Some of us can remember when boots reaching nearly to the knees were still worn in cities although there were no mudholes or brier patches to wade through. At the present time there is no reason for wearing heavy and high shoes in summer, yet only part of the urban population has adopted the lighter and lower styles. But the movement though slow is continuously in this direction. Shoes get more décolleté every year. This process of dematerialization will go on till there is nothing left of the shoe but its sole. Then we shall have the sandal, which is already coming into use, chiefly it is true for children, but the age limit is rising. Each summer more women adopt them and even an occasional member of the more conservative sex. The sandal is in some circumstances the most satisfactory compromise between hard shoes and barefootedness, for it gives stiffness and protection where it is most needed and yet leaves the foot undeformed and aerated.

Science News-Letter, September 10, 1927

The blue color of the snake's blood is due to copper.

Tuberculosis among Eskimos is prevalent because of crowded conditions in their homes.

A man's hat caught in the ice of a slowly moving glacier took 12 years to travel a mile.

Half the children under one year of age who contract scarlet fever die of the disease.

GENETICS

The Lability of Genes

Quotation from PROMETHEUS—H. S. Jennings—Dutton.

Not only what the cell within the body shall become, but what the organism as a whole shall become, is determined not alone by the hereditary materials it contains, but also by the conditions under which those materials operate; or by other materials that may be added later. Under diverse conditions the same set of genes will produce very diverse results. It is not true that a given set of genes must produce just one set of characters and no other. It is not true that because an individual inherits the basis for a set of characteristics, he must have those characteristics. In other words, it is not necessary to have a certain characteristic merely because one "inherits" it. It is not true that what an organism shall become is determined, foreordained, when he gets his supply of chemicals or genes in the germ cells, as the popular writers on eugenics would have us believe. The same set of genes may produce many different results, depending on the conditions under which it operates. True it is that there are limits to this; that from one set of genes under a given environment may come a result that no environment can produce from another set. But this is a matter of ilmitation, not of fixed and final determination; it leaves open many alternative paths. And even the limitations lose their sharp definition when we contemplate the possibility of introducing other chemicals among those produced by the original genes. Every individual has many sets of "innate" or "hereditary" characters; the conditions under which he develops determine which set he shall bring forth. The characteristics that appear under training are as much inherited characters as those appearing under other conditions; for the conditions help determine the characters in the one case as in the other. These sweeping statements are substantiated by precisely-known facts in many organisms.

Science News-Letter, September 10, 1927

Electric brakes for automobiles are predicted.

Silk culture is being fostered as a new industry in Mexico.

Fountains which sprayed rosewater were a luxury of wealthy Romans.

True Story of Archimedes

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in Wiesbaden. The antiquity of the mosaic is well attested by archaeologists of authority who put it at the time of the early Roman empire.

"Four birds resembling partridges occupy the four corners of the square mosaic. In the center of the border on each of the four sides is a bowl from which two leaf tendrils extend, one toward the bird in each corner. This beautiful border encloses the Archimedes design which tells the real story of his preoccupation and death. At one side a Roman soldier advances, his drawn sword in his right hand. With his left hand he points behind him toward the door with the gesture that clearly belongs to some such command of 'Begone!' Seated in a broad-backed chair is a bearded man of dignified demeanor who holds the two sides of an abacus, or counting board, on a low three-legged table standing before him. He is working with the abacus, which as is well authenticated, had a compartment on its face next to the lines of counters, on which in sand or dust one might draw figures. The scientist looks up in momentary amazement at the—to him—inexplicable soldier who has burst in so rudely upon him.

"The great Archimedes, then, was killed by a Roman soldier but not while he was standing in a room drawing mathematical designs upon the sand or dust on the floor. He met his end while he was seated in his study with an abacus before him on a table, on which he was originating some new mathematical proposition."

Science News-Letter, September 10, 1927

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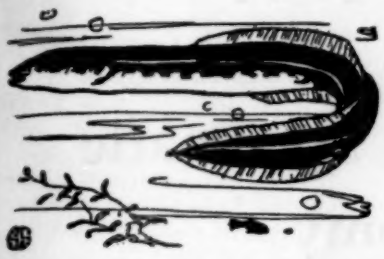
BIOLOGY

NATURE RAMBLINGS

By FRANK THONE



Eels

The good St. Patrick, it is said, drove the snakes out of Ireland into the sea. The legend does not tell whether he invited the eels, those odd fish that look like snakes, to come up out of the sea, and make the Friday fast no fast at all. The legend does not tell this, but it might well be the case, for it is in Ireland's slow rivers that the finest eels in Europe may be speared.

Eels are more appreciated on the other side of the water than they are in America. That is a pity, for we have fine eels of our own, and though they are queer to look at and require a queer kind of fishing to catch, they are decidedly not at all queer to eat. And the virtual impossibility of obtaining smoked eel here is nothing short of an unrealized national misfortune.

Eels are odd fish in more than appearance only. Both European and American species have one of the strangest life histories known throughout the whole animal kingdom. So obscure and hard to trace has it been, that it was only a few years ago that it was cleared up. Both European and American eels, when they are ready to breed, swim down the rivers to the sea and disappear. They migrate to the Atlantic Ocean depths near the West Indies, where they produce their eggs and then die. The young eels—elvers, they are called—look very little like eels during the first months of their lives, but gradually take on their typical elongate shape.

In the meantime they have started their long submarine trek toward their ancestral streams. How they ever travel those thousands of miles, with never a guide, and in the total darkness of the deep, no one can as yet hazard the wildest guess. But they do it somehow, taking several years for the journey, and at last come up the seaboard rivers with the rush of a living tide.

FORESTRY

Best Trees From Big Seed

The well-known agricultural principle, that better plants grow from large seeds than from small, has been tested out in forestry with promising results, according to E. N. Munns, chief of the office of forest experiment stations of the U. S. Forest Service.

In various tests with important western forest trees such as the California sugar pine, western yelbeen found that the largest seeds sown do produce the largest seedlings. When these seedlings are transplanted, however, either from one nursery bed to a more commodious one or to the forest, those grown from large seed slow down in their growth more than the others. At the end of a year or two in the transplant beds, or in the forest, the lead taken by the seedlings produced from the large seeds has disappeared. W. G. Wahlenburg, of the Northern Rocky Mountain Forest Experiment Station, who has been making a study of the subject, states that this is due to the fact that the roots of the larger trees are injured when torn from the soil or are more severely pruned at the time of transplanting than are those of the smaller trees. Thus if the larger seed is to produce the larger tree it must be sown not in a nursery bed but in the forest where the tree is to grow permanently.

Science News-Letter, September 10, 1927

BACTERIOLOGY

Typhoid In Oyster Juice

An additional danger of typhoid infection from oysters has been brought to light by Dr. William H. Park, director of the bureau of laboratories of the New York City Department of Health. He reports that the liquid in which shucked oysters are carried provides an excellent breeding ground for the typhoid bacillus. Bacilli from an infected oyster therefore not only may be carried by the liquid to other oysters but may increase during their sojourn in the liquid.

"Typhoid bacilli," he says, "have been shown to increase in the liquor of shucked oysters. With a sufficient rise in temperature the multiplication of typhoid bacilli that may be present will occur in the oyster liquid in which oysters are often transported. Thus the danger from a single infected bivalve is capable of being many times magnified by the time a consignment reaches its destination."

ARCHÆOLOGY

Building a Pyramid

Quotation from A HISTORY OF THE PHARAOHS, Volume I—Arthur Weigall—Dutton.

The Great Pyramid has been regarded for so long as an expression of the vanity of a ruthless and slave-driving tyrant, that I hesitate to point out the fallacy of this view. Yet the Pharaoh's motive was not vain, nor was the execution of the work tyrannical, though his government, it seems evident, was severe and the whole nation was keyed up to a very high degree of efficiency, and must have been organized in an astonishing and almost ruthless manner. He desired to build an everlasting monument which should be for all time the glory of his race, and which should strike awe into the hearts of the kings and peoples of the earth; and in this he so well succeeded that this monument has brought fame to Egypt throughout the ages, and still continues, nearly five thousand years later, to draw the world to the banks of the Nile.

. . . . for 20 years 100,000 men were employed for three months each year, that is to say, they worked only during the time of the annual inundation, when the agricultural population was idle, and a conscription of labor would not have impaired the resources of the country. This would mean the laying of an average of about 1,200 blocks every day; and as the stones which formed the core of the pyramid did not need to be laid with absolute precision, this rate of progress would not have been very exhausting. If we picture 300 blocks lying ready every day at each side of the pyramid, and if then we imagine a gang of some 30 men assigned to each block, we can well understand how, in the case of the lower tiers of the pyramid, the stones could have been quickly hauled up gently sloping brick ramps, each block resting upon a sledge, the runners of which were continuously made slippery by water; and we can realize that with 9,000 men available on each 755-foot front of the pyramid—that is to say, about 36,000 men all told—far more than 1,200 blocks could have been easily and cheerfully dragged into position in a few hours, without confusion and without any of that sweating and straining under the taskmaster's lash which is so often supposed to have been a painful feature of the work. Another 36,000 men would have been required for the daily task of dragging the blocks along

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Building a Pyramid

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the causeway to the foot of the pyramid from the edge of the fields where they had been deposited by the boats or rafts which had brought them from the quarries; and the remaining 28,000 men would have more than sufficed for the many other necessary tasks. In the higher stages of the work the number of stones laid each day would have been smaller, for there must have been some congestion upon the narrow, sloping ramps leading from one tier to the next, and the haulage was longer and more arduous. Scores of these brick ramps must have bigzagged in gentle gradients up each side of the growing pyramid; and all day long these gangs of men must have dragged the blocks of stone up them, singing as they went —for thus to this day the Egyptian labourers lighten their task—while the overseers clapped their hands to lead the songs or swung their whips about in harmless and good-natured energy, even as they do today.

Science News-Letter, September 10, 1927

The bee and silkworm are the only insects put to work on a factory basis by man.

BINDER COVERS

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The B N A

Arranged as an Outline of

Regional and Systematic Anatomy

A Contribution to the Science and Teaching of Anatomy

BY

Victor E. Emmel

Professor of Anatomy, College of Medicine, University of Illinois
Laboratory Guest at The Wistar Institute of Anatomy and Biology

REVISED SECOND EDITION

The Basle Anatomical Nomenclature (the B N A) has been preeminently successful in the elimination of approximately 45,000 unnecessary synonyms for the macroscopic structures of the human body, and has consequently become an international anatomic language.

This list of some 5,000 terms, intended for common use in the medical schools, was arranged on the basis of systematic human anatomy.

It appears obvious, however, that, from the standpoint of practical anatomy, a regional arrangement of these terms in conjunction with their systematic tabulation would greatly increase the usefulness of the B N A.

With this objective in mind, the present systematic B N A has been expanded to include a correlated regional arrangement of anatomical terms—an arrangement based upon the sequence in which the structures indicated by these terms may be exposed and demonstrated to the naked eye in actual dissection—thus securing a direct association of the term with the visualization of the structure to which it refers.

Although a minimum encroachment upon individual initiative is evaluated as a dominant objective to be sought, concise statements are given for the more difficult incisions and dissections involved in the demonstration of the structures listed. The order in which the regions are dealt with is based upon a sequence which facilitates observation of those structural relationships of greatest practical significance. The work consequently constitutes a basis for a direct correlation of anatomical terminology and structure in the practical study of the cadaver and presents a résumé of regional and systematic anatomy for anatomical and clinical reference.

This book of about 250 pages, illustrated with twelve plates and figures in delineation of surface anatomy and surface projections of the skeleton, will be ready September 15, 1927. Price, $3.50, bound in cloth.

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First Glances at New Books

BEING WELL-BORN — Michael F. Guyer—*Bobbs-Merrill* ($5). A new and completely revised edition of professor Guyer's classic, embodying the new data brought forth by the decade of research that has elapsed since it was first published. In an age when obedience to the ancient command, "Know thyself," is more imperative than ever before, no person who undertakes to live intelligently can afford to neglect this well-digested source of information about the most intimate and important of all self-knowledge.

Science News-Letter, September 10, 1927

TEXTILE FABRICS — George H. Johnson—*Harper and Bros.* ($5). Somplete information, compactly presented covering both standard and little known fabrics. Especially valuable are the discussions of defects and manufacturers' falcifications, and the fate these meet under the strain of wear and laundering. The book is well illustrated with photomicrographs of all imaginable kinds of fabrics and raw materials.

Science News-Letter, September 10, 1927

ILLUSTRATIONS OF THE METHODS OF REASONING — Daniel Sommer Robinson—*Appleton* ($2). An approach to logical theory through a study of thinking in the concrete. Nine logical methods by which one may reason from known facts to sound conclusions illustrated by examples drawn from contemporary scientific literature.

Science News-Letter, September 10, 1927

THE FAMILY FOOD SUPPLY — *Metropolitan Life Insurance Co.* Shows the housewife how to get the most vitamins and calories for the least expenditure of money.

Science News-Letter, September 10, 1927

A POPULAR GUIDE TO THE GEOLOGY AND PHYSIOLOGY OF ALLEGANY STATE PARK—A. K. Lobeck—*The University of the State of New York.* An excellently constructed handbook on one of the best organized of state parks, illustrated with many photographs, maps and diagrammatic drawings.

Science News-Letter, September 10, 1927

HANDBOOK OF LABOR STATISTICS—*Government Printing Office.* Over 800 pages, crammed with facts and figures useful to the economist and social worker as well as to the employer of labor.

Science News-Letter, September 10, 1927

ASTRONOMY

Stars Cool At 3600 Degrees

A star is about as cold as it can be at a temperature of 3600 degrees Fahrenheit. At least if there are any cooler stars in the heavens, a search at the Mt. Wilson Observatory in California has not found them. Drs. Paul W. Merrill and Milton L. Humason reported this research to the astronomers.

Two great classes of stars, the giants and dwarfs, are known to astronomers. The giants form a series, depending on their spectral characteristics, revealed when their light is analyzed. This series ends abruptly with a group of red stars whose light increases and diminishes in long periods. At their maximum brightness, they are slightly above 2000 degrees Centigrade, or 3600 degrees Fahrenheit, in temperature.

Science News-Letter, September 10, 1927

ARCHÆOLOGY

En-Shag-Kush-Anna

Three thousand years before the Jews
Had picked the crop of manna,
There was a king in Babylon,—
His name, En-Shag-Kush-Anna.

En-Shag deserves a just renown;
Him, first, our history places.
His name and fame are handed down
Inscribed upon some vases.

He was the king of Kengi, and
Of Bel he was *patesi;*
As both the lay and godly chief
He didn't have it easy.

With fewer gods in Babylon
His job would yet be irksome;
With all the duties that he had,
We're sure he had to shirk some.

Kush-Anna's race we do not know,—
Perhaps it was Sumerian;
But we can state with certainty,
He wasn't Unitarian.

En-Shag's bffl??gkqj bkp bgkq jjp kqj
The vases say, was Kish;
And thus to slay the Kishite men
Was old Kush-Anna's dish.

No doubt, like kings of later times,
His fault was peculation;
Although, in fairness to the king,
This guess is speculation.

We feel impelled to drop a tear
To dry on our bandana,
When thinking of the early death
Of poor En-Shag-Kush-Anna.

—RICHARD ASHMAN.

Science News-Letter, September 10, 1927

PHYSICS

Radio Waves Act Like Light

Exploring that region of radio waves so short that they approach the invisible heat and infra-red rays, engineers of the General Electric Company have discovered interesting and unexpected phenomena.

An experimental 5-meter radio sending set was recently put into operation at South Schenectady where the experimental radio work of the company is done. Previous tests with sending stations on 15 to 30 meters, wave lengths far below those usually used in broadcasting, had caused the engineers to expect somewhat unusual results, such as complete fading close to the station and extremely satisfactory reception at extreme distances.

But in the preliminary tests with the 5-meter set, it was found that radio signals of that high frequency had a shadow effect very much like light. A small hill prevented reception in the valley beyond. To give the light-like radio waves as long a reach as possible the small transmitting set was hoisted to the top of two fifty-foot towers. Under these conditions it was possible to pick up the signals 32 miles away using 60 watts power. All tests so far have been made during the day, but night tests with 500 watts power are scheduled. A receiving set for the short waves will be placed in the top of the Woolworth Building in New York City, some 135 miles away, in order to test further the properties of the 5-meter waves. This tall New York building was selected because maps show that there is an uninterrupted line of "vision" between it and the Schenectady sending set.

The experimental radio station, 2XAF, operating on a slightly longer wave length, 32.77 meters, has been heard all over the world. Using an antenna only 25 feet long it has been picked up and rebroadcast in Australia. One peculiarity of this sort of radio wave is that it skips over considerable distances, being inaudible, for instance, between 10 and 1,000 miles from the station.

Science News-Letter, September 10, 1927

A civilization that bores its beneficiaries is perhaps even worse than one which overworks its slaves.—*George W. Alger.*

Science News-Letter, September 10, 1927

Every science aims at foresight.—*Comte.*

Science News-Letter, September 10, 1927

How to Use Key-Word Feature of News-Letter

In order to aid in catching the items that concern you and to facilitate clipping and filing, a key word in small capitals has been printed on the right of the line above each article. The key words used fit into any system of classification, whether it be a straight alphabetical file, a system of your own devising, the Library of Congress classification or the Dewey system.

Note that you can slip out any article without fear of damaging another article in which you might be interested, since editorial matter printed on the right-hand pages is backed by advertising, standing matter or a continuation of the article on the other side.

Library of Congress Classification

The classification of the Library of Congress has come into common use in the libraries of the country owing to the publication of the Government of the card index of all new books. We print below a list of the subject titles which are most used in the SCIENCE NEWS-LETTER. The full scheme of classification is contained in "Outline Scheme of Classes," issued by the Library of Congress.

A General Works. Polygraphy.
B Philosophy.
BF Psychology.
G Geography, voyages, travel.
GA Mathematical and astronomical geography.
GB Physical geography.
GC Oceanology and oceanography.
GF Anthropogeography.
GN Anthropology. Somatology. Ethnology. Ethnography. Prehistoric archæology.
GR Folklore.
GT Manners and customs.
GV Sports and amusements. Games.
HC Economic history and conditions. National production.
HD Economic history. Agriculture and Industries.
HE Transportation and communication.
HF Commerce.
HM Sociology. General.
HQ Family. Marriage. Woman.
HV Social pathology.
L Education.
M Music.
N Fine arts.
P Philology and linguistics.
Q Science. General.
QA Mathematics.
QB Astronomy.
QC Physics.
QD Chemistry.
QE Geology.
QH Natural history.
QK Botany.
QL Zoology.
QM Human anatomy.
QP Physiology.
QR Bacteriology.
R Medicine. General.
S Agriculture. General.
SB Field crops. Horticulture. Landscape gardening. Pests and plant diseases.
SD Forestry.
SF Animal culture. Veterinary medicine.
SH Fish culture and fisheries.
SK Hunting. Game protection.
T Technology. General.
TA Engineering. General.
TC Hydraulic engineering.
TD Sanitary and municipal engineering.
TE Roads and pavements.
TF Railroads.
TG Bridges and roofs.
TH Building construction.
TJ Mechanical engineering.
TK Electrical engineering and industries.
TL Motor vehicles. Cycles. Aeronautics.
TN Mineral industries. Mining and Metallurgy.
TP Chemical technology.
TR Photography.
TS Manufactures.
TT Trades.
TX Domestic science.
U Military science. General.
V Naval science. General.

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030 General cyclopedias
040 General collected essays
050 General periodicals
060 General societies
070 Newspapers
080 Special libraries. Polygraphy.
090 Book rarities
100 PHILOSOPHY—
110 Metaphysics
120 Special metaphysical topics
130 Mind and body
140 Philosophical systems
150 Mental faculties. Psychology
160 Logic
170 Ethics
180 Ancient philosophers
190 Modern philosophers
200 RELIGION—
210 Natural theology
220 Bible
230 Doctrinal. Dogmatics. Theology
240 Devotional. Practical
250 Homiletic. Pastoral. Parochial
260 Church. Institutions. Work
270 Religious history
280 Christian churches and sects
290 Ethnic. Non-Christian
300 SOCIOLOGY—
310 Statistics
320 Political science
330 Political economy
340 Law
350 Administration
360 Associations. Institutions
370 Education
380 Commerce. Communication
390 Customs. Costumes. Folklore
400 PHILOLOGY—
410 Comparative
420 English
430 German
440 French
450 Italian
460 Spanish
470 Latin
480 Greek
490 Minor Languages
500 NATURAL SCIENCE—
510 Mathematics
520 Astronomy
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670 Manufactures
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690 Building
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730 Sculpture
740 Drawing. Decoration. Design
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760 Engraving
770 Photography
780 Music
790 Amusement
800 LITERATURE—
810 American
820 English
830 German
840 French
850 Italian
860 Spanish
870 Latin
880 Greek
890 Minor languages
900 HISTORY—
910 Geography and travels
920 Biography
930 Ancient history
Modern
940 Europe
950 Asia
960 Africa
970 North America
980 South America
990 Oceania and polar regions

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Anniversaries of Science

September 17, 1789—Enceladus, which with Mimas is an innermost satellite of Saturn, was discovered by Herschel.

Among all the beautiful and wonderful sights which the heavens afford, the four leading ones, perhaps, are the glories of the rising and setting sun, a total solar eclipse, the aurora with its weirdly dancing polar streamers, and the telescopic view of the planet Saturn. To see that silvery ball, so delicately poised within its wonderful rings, is a sight that never fails to charm, however familiar.

Like Jupiter, Saturn shows spots upon its surface occasionally though far less conspicuously than Jupiter. From observing them, the time of rotation is known. It is 10h 14m at the equator and longer towards the poles, as with Jupiter and also with the sun. This planet is the least dense of any of them, indeed only 0.7 the density of water, and thus little more than half the density of Jupiter. It is as well provided with moons as Jupiter, for each has nine. The ninth satellite, discovered in 1898 by W. H. Pickering, makes its revolution in opposite direction to the others.

—Abbot: *The Earth and the Stars.*

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September 19, 1848—Hyperion, seventh satellite of Saturn, was discovered by Lassell.

And deeper yet, like molten opal shining
My belt of rainbow glory softly streams,
And seven white moons around me intertwining
Hide my vast beauty in a mist of dreams.
—Noyes: *Watchers of the Sky.*

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September 20, 1519—Magellan's fleet of 5 ships set sail from Spain. Three years later one of them returned, having circumnavigated the globe.

Tuesday, the 20th of September, 1519, a favorable breeze having sprung up, he gave the order to weigh, and a little later the ships cleared the river and commenced the memorable voyage which, through almost unparalleled suffering and disaster, was to win an immortal name for its survivors as the first circumnavigators of the globe.

—Guillemard: *Life of Ferdinand Magellan.*

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BOTANY

Seedless Grape Bred

A new variety of seedless grape, similar to the "Sultanina" of the warmer lands of Europe and Southern California but able to withstand New York winters, has been produced by a cooperative breeding project of the state experiment station at Geneva and the New York Botanical Garden, according to Dr. A. B. Stout of the latter institution. A Sultanina vine, which produces pollen but no seeds, was chosen as the male parent, and crossed with another light-skinned grape which produces a very few seeds.

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MEDICINE

Glass Passes Health Rays

Tuberculosis victims, rickety babies and other shut-ins can now enjoy the health-giving rays of sunlight indoors. The council on physical therapy of the American Medical Association has tried out the various glass substitutes on the market that have been designed by ingenious manufacturers to admit the ultra-violet rays cut out by ordinary window glass, and have found four that pass muster of both spectroscopic and biological tests.

Two of the samples tested are transparent to the visible rays of sunlight as ordinary window glass though one can be supplied in an opaque form if desired. Both partake of the nature of true glasses but are more expensive. They will probably find considerable use ultimately, in solaria, nurseries, schools, and playrooms.

The other two samples are of a less permanent character and did not rank quite so high in the tests as the first two in their power to admit anti-rachitic rays. One is composed of a wire-mesh screen filled with some sort of celluloidinous material while the other is a thin, fairly loosely woven cloth treated with a paraffin-like substance. These are opaque but more or less unbreakable and sell at a lower figure than window glass.

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PHYSIOLOGY

Man Eats Little of Total

Burning 8,900,000,000,000 tons of coal, 8,900 times as much as the world produces in a year, will release about as much energy as contained in the sunlight captured annually through the production of plant foods. Of this huge total, the human race uses less than two-tenths of a per cent., according to an estimate made by Dr. John M. Arthur, of the Boyce Thompson Institute for Plant Research.

Every day each one of the 1,700,000,000 human beings of the earth consumes about 2,000 calories of food. Even meat comes indirectly from plants. The human race is therefore dependent on photosynthesis, the process by which the plant uses sunlight to form food. The total consumption of food during the year by man amounts to about 1,200,000,000,000,000 calories. All of the other animal life, vertebrate or invertebrate, large or microscopic, on the globe as estimated to consume about six times this amount.

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BOTANY

Bananas Still Plenteous

Despite the news that the United Fruit Company has sent for an expert to recommend plantings of other fruits in huge acreas where banana wilt has made the growing of bananas unprofitable, there is no chance that the words of the one-time popular song, "Yes, We Have No Bananas" will ever come true, according to Dr. W. A. Orton, scientific director of the Tropical Plant Research Foundation.

Although banana wilt has caused the loss of millions to the commercial banana industry in Central America, and continues to spread, the situation is far from hopeless, said Dr. Orton. One variety naturally resistant to the disease has been found, the Cavendish banana. This variety is small and not very well adapted to trade, since it must be shipped in special containers, but the fact that it is not subject to banana wilt is in itself encouraging. The development of resistant strains of desirable varieties was recommended some time ago by E. W. Brandes of the U. S. Bureau of Plant Industry. Experiments in this field have been carried on for some time by the United Fruit Company, and although they have so far met with little apparent success, they may at any time do so.

Another hopeful sign in the fight against banana wilt was the recent investigation by Prof. J. Knudson, of Cornell, of the relation of the chemical content of the soil to susceptibility to wilt. He found that bananas grown in soil with a large lime content were not apt to be subject to the disease.

Research in the banana wilt field will eventually yield a solution of the problem, Dr. Orton said, and insure to the public an endless supply of desirable varieties of this important fruit, which leads all others in food value and surpasses most of the vegetables in energy value and tissue-building elements.

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GENERAL SCIENCE

Pharmacists Celebrate

Delegates to the seventy-fifth annual meeting of the American Pharmaceutical Association recently celebrated the diamond anniversary of their organization at St. Louis. Some five hundred pharmacists reported and discussed the latest developments in the field of pharmacy.

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The sword attached to a swordfish is sometimes three feet long.

The Problem of Translation—

¶Science, probing the unknown universe, writes its findings in cryptic language. A stellar galaxy shining faintly in the heavens hides its splendor and its immensity in numbers and formulæ; a minute germ has thrust upon it a long Latin name. With the aid of such scientific shorthand and such technicalities, science pushes on to new discoveries and new heights.

¶Yet the facts and the methods of science must penetrate and permeate the whole fabric of civilization if the world is to become an increasingly better place to live in. The man in the street, the woman in the home, the child in the school, the merchant in the counting house, the judge on the bench, the priest in the temple, all of those who make the world, must know, appreciate, understand and cherish the spirit of research and the power of thought.

¶To *translate* and *interpret* science—that is the function of SCIENCE SERVICE. The thrill and wonder of science reaches two million and a half newspaper readers through SCIENCE SERVICE news dispatches daily. Millions more read SCIENCE SERVICE's other newspaper articles, its magazine articles and its books.

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